

Claims

5 1. Arrangement for mooring, loading and unloading of a vessel, comprising:  
a stationary inner tower with a lower end fixedly anchored to the seabed, from where the  
inner tower extends upwards through the sea to an upper end over the sea level, which  
inner tower at level close to the seabed has through connections for hoses and cables for  
transfer of load and signals, which hoses and cables are brought further up through the  
10 inner tower and out of its upper end,

15 a yoke that in one end is rotatably fastened to the inner tower, wherefrom the  
yoke extends further outwards to at least one outer ballastable end wherefrom moorings  
are arranged to keep the vessel anchored, on which vessel devices are provided to connect  
the vessel with the moorings and said hoses and cables for transfer of load and signals,

15 characterized in that the arrangement further is comprising  
an outer tower with rotatable fastening to the inner tower, which outer tower from  
the fastening to the inner tower extends upwards outside the inner tower to a level over  
the upper end of the inner tower, wherein the rotatable fastening is placed below sea level  
and also is comprising the fastening of the yoke, such that the outer tower and yoke as one  
20 unit is freely rotatable over and around the inner tower that is stationary anchored to the  
seabed, and

25 a swivel provided between the upper end of the inner tower and the upper end of  
the outer tower, for rotatable transfer of load and signals with said hoses and cables  
between the inner and the outer tower and therefrom further to the vessel.

25 2. Mooring arrangement according to claim 1,  
characterized in that the rotatable fastening of the outer tower and the yoke is at depth  
level deeper than the largest draught for vessels that is to load or unload, preferably close  
to the lower end of the inner tower, a short distance over the seabed.

30 3. Mooring arrangement according to claim 1,  
characterized in that the rotatable fastening of the outer tower and the yoke, the placement  
thereof, the length of the yoke and the length of the moorings with a typical vessel  
anchored for loading and unloading, have design such that an extension of the  
35 longitudinal axis of the yoke penetrates the stationary anchoring in the seabed.

4. Mooring arrangement according to claim 1,

characterized in that the rotatable fastening of the outer tower and the yoke is comprising a rotatable disc with fixed self lubricating bearings comprising a main radial bearing, an upper axial bearing and a lower axial bearing.

5 5. Mooring arrangement according to claim 1,  
characterized in that the yoke is formed as a  $\Delta$  with top point in the end fastened to the  
inner tower and two outer ends between which outer ends ballast chambers are provided,  
from which two outer ends moorings are provided to hold the vessel anchored.

10 6. Mooring arrangement according to claim 1,  
characterized in that the yoke is fastened to a protrusion in a rotatable disc that is rotatable  
around the inner tower, in that the yoke is rotatably bolted to said protrusion with a  
fastening bolt with longitudinal axis parallel with the plane of the rotatable disc and  
tangential to the rotation axis of the rotatable disc, and where the yoke outside the  
15 rotatable disc in its longitudinal axis has a rotatable pin for rotation around the  
longitudinal axis, such that the yoke is moveable around three axes.